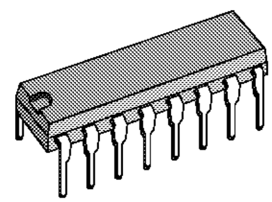
SGS-THOMSON MICROELECTRONICS

TEA1330

FM STEREO DECODER

- REQUIRES NO INDUCTORS
- LOW EXTERNAL PART COUNT
- ONLY OSCILLATOR FREQUENCY ADJUSTMENT NECESSARY
- INTEGRAL STEREO/MONAURAL SWITCH WITH HIGH LAMP DRIVING CAPABILITY
- WIDE SUPPLY RANGE : 3V TO 14V
- EXCELLENT CHANNEL SEPARATION MAINTAINED OVER ENTIRE AUDIO FREQUENCY RANGE
- LOW DISTORSION : TYPICALLY 0.3% AT 150mV$_{RMS}$ COMPOSITE INPUT SIGNAL
- EXCELLENT SCA REJECTION (76dB Typ.)



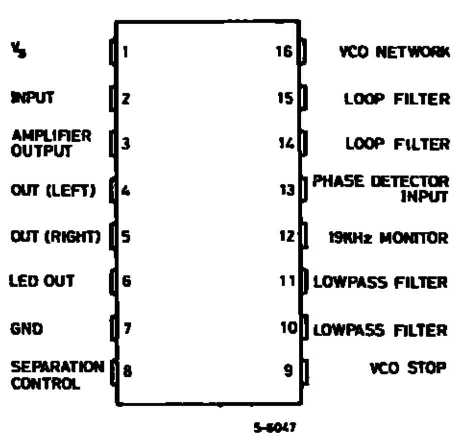
DIP16

ORDER CODE : TEA1330

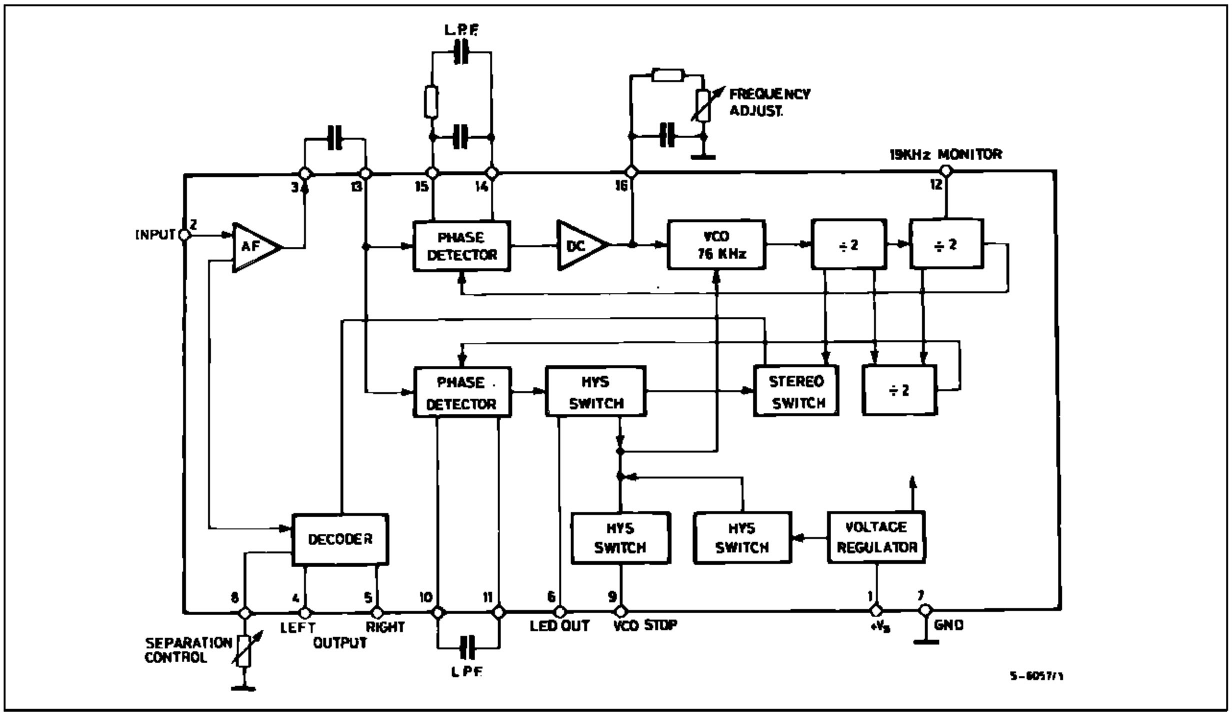
DESCRIPTION

The TEA1330 is a monolithic decoder circuit for FM stereo transmissions. Packaged in a 16-pin DIP, it functions with very few external components and requires no inductors.

PIN CONNECTION



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage	16	V
I_L	Lamp Current	75	mA
P_{tot}	Power Dissipation at $T_{amb} = 70^oC$	800	mW
T_{oper}	Operating Temperature	- 25, + 75	^oC
T_{stg}	Storage Temperature	- 55, + 150	^oC

THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ (j-a)}$	Junction-ambient Thermal Resistance	Max.	100	$^oC/W$

ELECTRICAL CHARACTERISTICS (refer to the test circuit, $T_{amb} = 25^oC$, $V_S = 6V$, $V_I = 300mV_{RMS}$ (L + R = 90%, pilot 10%), $f_m = 1kHz$, unless otherwise specified)

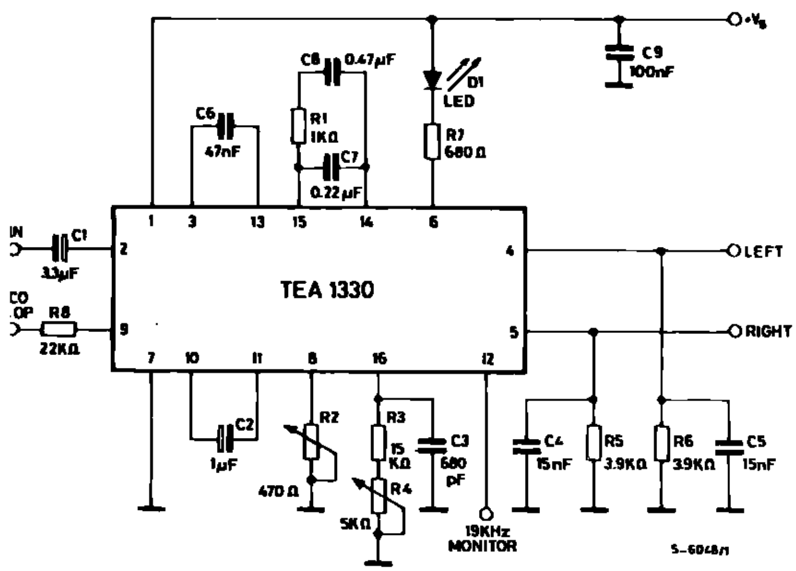
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range		3		14	V
I_D	Current Drain	Lamp "OFF"		18		mA
V_I	Max. Standard Composite Input Signal	d = 1%	300			mV_{RMS}
V_I	Max. Mono Input Signal	d = 1%	300			mV_{RMS}
R_I	Input Resistance			40		kΩ
Sep	Stereo Channel Separation	R2 = Variable (see note 1) R2 = 270Ω	35 25	50 40		dB dB
V_O	Audio Output Voltage			265		mV
CB	Mono Channel Balance	Pilot Tone "OFF"	- 2	0	+ 2	dB
d	Total Harmonic Distortion	$V_{IN} = 150mV_{RMS}$		0.3		%
UR	Ultrasonic Frequency Rejection	f = 19kHz f = 38kHz		32 48		dB dB

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
SCA-R	SCA Rejection (see note 2)	f = 67kHz		76		dB
S/N	Signal to Noise Ratio			80		dB
V_{th}	Muting Threshold Voltage (Pin 9)	ON (VCO stop) OFF		1 0.8		V V
L_{ON}	Pilot Input Level for Lamp ON	f = 19kHz	4	6	9	mV
Hys	Pilot Input Level Hysteresis for Lamp Turn ON-OFF	f = 19kHz		3		dB
CR	Capture Range			± 7		%

Notes : 1. R2 has to be adjusted for best figure of channel separation.
2. SCA = AUX. SUB. CARRIER.

Figure 1 : Test Circuit



TYPICAL DC VOLTAGES

Pins	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(V)	6	1.9	1.3	3	3		0	0.18		1.4	1.4	1.2	1.4	1.4	1.4	2.2

Figure 2 : P.C. Board and Components layout of the test Circuit of Figure 1 (1:1 scale)

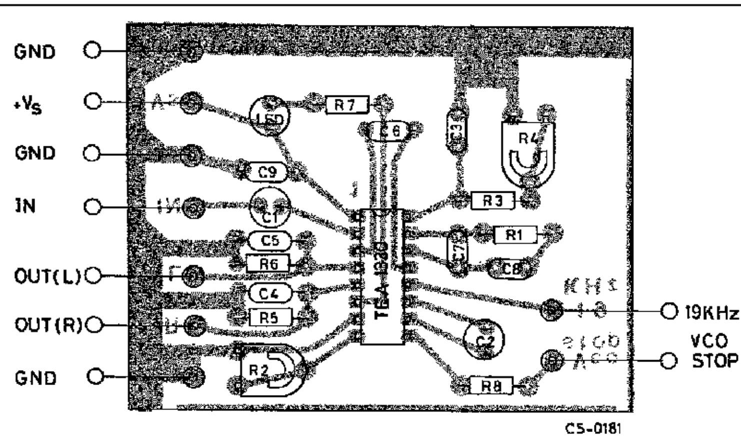


Figure 3 : Channel Separation versus Modulation Frequency

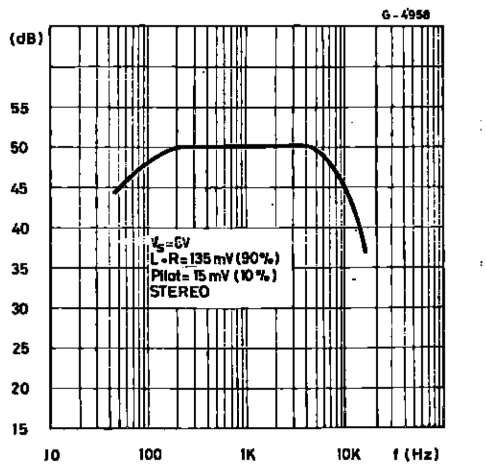


Figure 4 : Distorsion versus Modulation Frequency

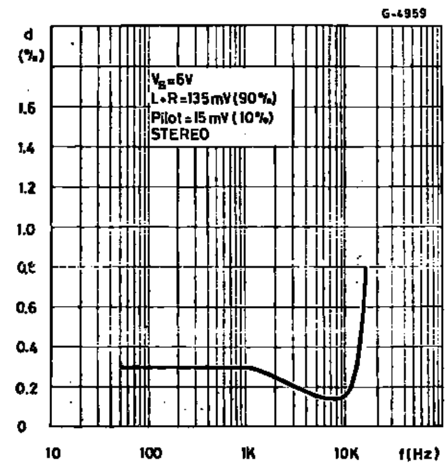


Figure 5 : Channel Separation versus Input Level

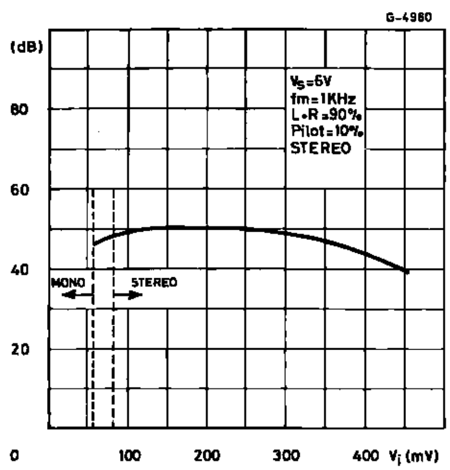


Figure 6 : Distorsion versus Input Level

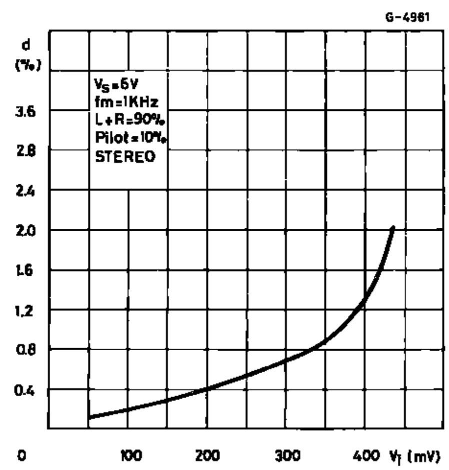


Figure 7 : Channel Separation versus Supply Voltage

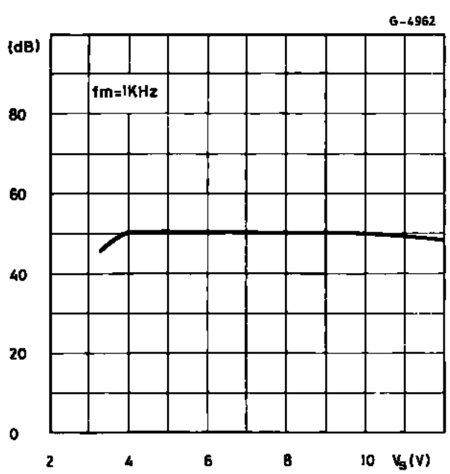
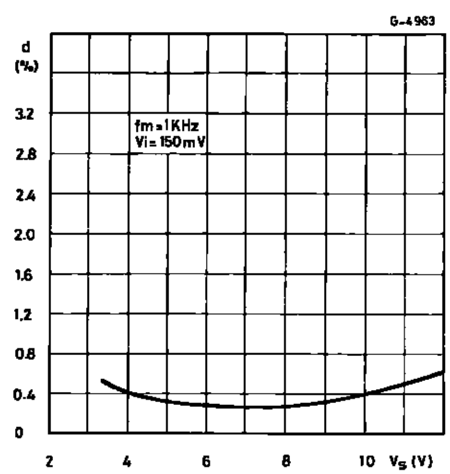


Figure 8 : Distorsion versus Supply Voltage

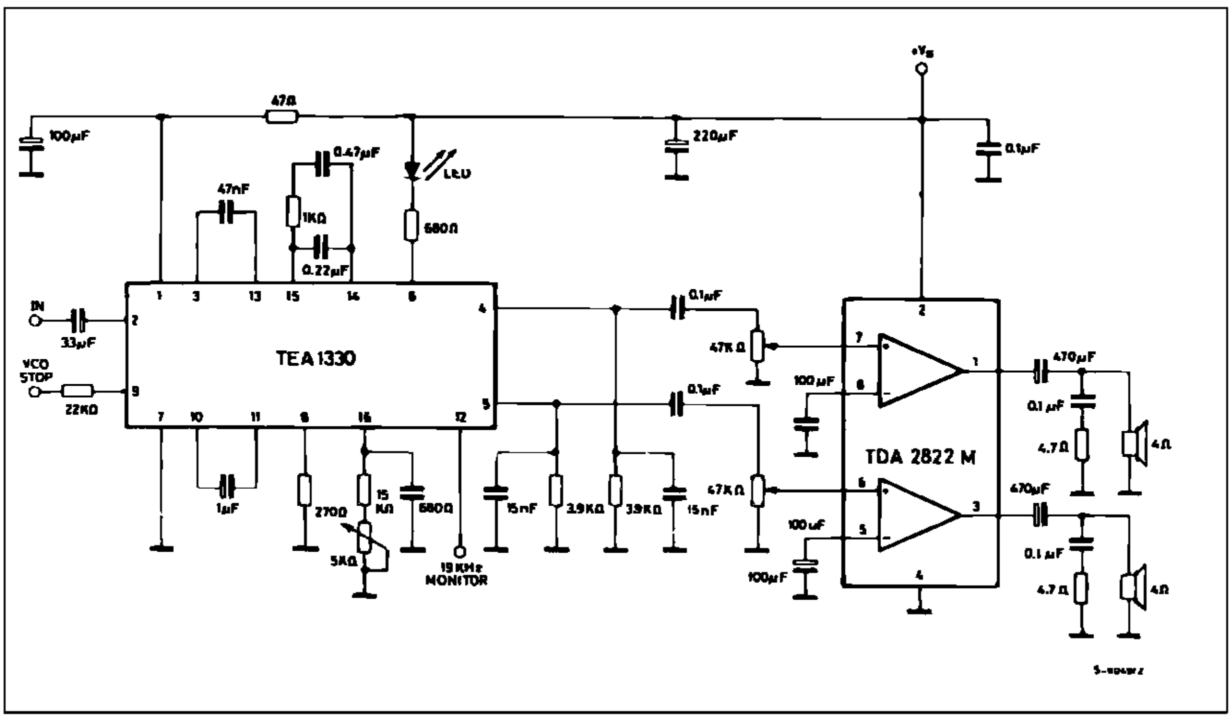


APPLICATION SUGGESTION (see Test Circuit of Figure 1)

Component	Recommended Value	Purpose	Smaller than Recommended Value	Larger than Recommended Value
C1	3.3mF	Input Coupling	Poor Low Frequency Response and Separation	
C2	1µF	LPF for Stereo Switch Level Detector	Shorter Time to Switch Mono to Stereo	Longer Time to Switch Mono to Stereo
C3 (note 1) R3 R4	680pF 15kΩ 5kΩ	Set VCO Free Running Frequency		Narrower Capture Range
C4 R5 (note 2)	15nF 3.9kΩ	Load and Deemphasis Right Channel	Low Output Voltage	Higher Distorsion for Low V_S
C5 R6 (note 2)	15nF 3.9kΩ	Load and Deemphasis Left Channel	Low Output Voltage	Higher Distorsion for Low V_S
C6	47nF	Input PLL Coupling	Poor Low Frequency Response and Separation	
C7 C8 R1	220nF 470nF 1kΩ	Loop Filter	High Stereo Distorsion	Narrower Capture Range
D1		Stereo Indicator		
R7		Sets Lamp Current	Excess IC Dissipation	Dim Lamp
RE (note 3)	270Ω	Channel Separation		

Notes :
1. Polyester ± 5%
2. Deemphasis = 50µs
3. Separation can be improved by trimmer adjustment (470Ω)

Figure 9 : Application Circuit for Portable Stereo Radio Receivers



DIP16 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050

